National Institute of Environmental Health Sciences

Impact of climate change and man-made irrigation systems on the transmission risk, long-term trend and seasonality of human and animal fascioliasis in Pakistan

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Abstract:

Large areas of the province of Punjab, Pakistan are endemic for fascioliasis, resulting in high economic losses due to livestock infection but also affecting humans directly. The prevalence in livestock varies pronouncedly in space and time (1-70%). Climatic factors influencing fascioliasis presence and potential spread were analysed based on data from five meteorological stations during 1990-2010. Variables such as wet days (Mt), water-budget-based system (Wb-bs) indices and the normalized difference vegetation index (NDVI), were obtained and correlated with geographical distribution, seasonality patterns and the two-decade evolution of fascioliasis in livestock throughout the province. The combined approach by these three indices proved to furnish a useful tool to analyse the complex epidemiology that includes (i) sheep-goats and cattlebuffaloes presenting different immunological responses to fasciolids; (ii) overlap of Fasciola hepatica and F. gigantica; (iii) co-existence of highlands and lowlands in the area studied; and (iv) disease transmission following bi-seasonality with one peak related to natural rainfall and another peak related to man-made irrigation. Results suggest a human infection situation of concern and illustrate how climate and anthropogenic environment modifications influence both geographical distribution and seasonality of fascioliasis risks. Increased fascioliasis risk throughout the Punjab plain and its decrease in the northern highlands of the province became evident during the study period. The high risk in the lowlands is worrying given that Punjab province largely consists of low-altitude, highly irrigated plains. The importance of livestock in this province makes it essential to prioritise adequate control measures. An annual treatment scheme to control the disease is recommended to be applied throughout the whole province.

Source: http://www.ncbi.nlm.nih.gov/pubmed/24893010

Resource Description

Exposure :

weather or climate related pathway by which climate change affects health

Ecosystem Changes, Food/Water Security, Food/Water Security, Temperature

Food/Water Security: Livestock Productivity

Temperature: Fluctuations

Geographic Feature:

resource focuses on specific type of geography

Freshwater

Geographic Location:

resource focuses on specific location

Non-United States

Non-United States: Asia

Asian Region/Country: Other Asian Country

Other Asian Country: Pakistan

Health Impact:

specification of health effect or disease related to climate change exposure

Infectious Disease

Infectious Disease: Foodborne/Waterborne Disease

Foodborne/Waterborne Disease: Fascioliasis

Resource Type:

format or standard characteristic of resource

Research Article

Timescale:

time period studied

Time Scale Unspecified